

when they occur. A few examples will suffice. On pp. 2 and 36, the terms "cœlomique" and "cœlome" refer to a blastocœlic space; on p. 60, "gemmules" is given as an alternative expression to "bourgeons," which arise as outgrowths involving all the layers of the body (e.g. *Lophocalyx*), whereas on p. 177 the endogenous "gemmules" of *Spongilla* are rightly described as special formations, quite distinct from ordinary lateral or exogenous buds, although the buds of *Tethya* (p. 167) seem to be intermediate between the exogenous and endogenous varieties. On p. 91 (footnote), Sollas's term *collenchyme* is branded, with other related terms, as "bien inutile," but on p. 152 the superficial cortex of *Geodia* is characterised as "collenchymateuse."

In a footnote on page 203, we are reminded that H. J. Carter instituted a comparison between the flagellated chambers of sponges and the branchial sac of Ascidians. The authors add that this comparison "nous semble bien singulière aujourd'hui ou ces êtres sont mieux connus." On the contrary, the comparison is appropriate, the analogy between the flagellated chambers of a sponge (in respect of their respiratory and nutritive functions and of their relations to the inhalent and exhalent canals) and the branchial sacs of the Ascidozooids in a compound Tunicary (cf. especially the Didemnidæ) being an extraordinarily close one; but of course Carter was innocent of the distinction between homology and homoplasy. What is very singular indeed is the fact that, in these latter days, the same fatal confusion between actual physiological conditions and abstract genetic relationships is constantly being repeated.

A. W.

THE DURATION OF THE BRITISH COAL-FIELDS.

Les Charbons Britanniques et leur épuisement. By E. Lozé. Pp. ix + 559, and vii + 562 to 1229. (Paris: C. Béranger, 1900.)

IN France, as in the rest of Europe, consumers have during the past winter been complaining of the difficulty of obtaining an adequate supply of coal, the chief cause of the increased demand having been the activity in the iron and steel trades. At the same time, prolonged strikes in Austria and elsewhere, and the temporary cessation of the production of the collieries of Natal and Cape Colony, have lessened the supplies usually available. The prevailing scarcity of coal is a matter of serious moment to France, where, owing to the increasing depth of the collieries and the costly nature of mining operations, the quantity of coal that has to be imported from other countries grows larger every year. At the present time about two-thirds of the coal consumed in France is raised in the country; and last year the imports amounted to 10,500,000 tons, of which quantity 5,000,000 tons were obtained from Great Britain. France being so largely dependent on Great Britain, it will readily be seen that the duration of the British coal-fields is a subject of no little importance to French economists. M. Lozé has, therefore, been induced to devote two bulky volumes, covering together 1229 pages, to a critical consideration of the investigations of Prof. Stanley Jevons, the Right Hon. Leonard H. Courtney, Mr. R. Price-

Williams, Mr. T. Forster Brown, Prof. E. Hull and other English writers.

The results of his studies are grouped in four sections. The first contains an account of the geography of the British Isles, with historic, geological and economic details. The second section contains a detailed description of each of the British coal-fields, with a chapter on the coal resources of the Colonies. The third section deals with commercial geography, water and railway transport, and the principal industrial centres. The fourth and last section contains an estimate of the coal supplies of the United Kingdom, with a summary of the views expressed as to their probable duration. The work concludes with a lengthy appendix dealing with cognate matters, the production and consumption of mineral fuel in various parts of the world, the constitution of the British Colonial empire, the navy and the army.

In discussing the views of the various authorities, the author prefers to accept the pessimistic forecast of Mr. T. Forster Brown rather than the optimistic estimate of Prof. Hull. Mr. Forster Brown calculates that the amount of coal of good quality remaining in the United Kingdom at a depth not exceeding 2000 feet, the depth that he regards as the limit of economical mining, is 15,000 million tons. Such is the supply on which Great Britain must base its hopes in the inevitable economic conflict with the United States. In spite of the care and accuracy with which the divergent views on the subject are set forth, it may be doubted whether the author has made out a clear case for rejecting Prof. Hull's estimates, which show that the amount of coal remaining within a depth of 4000 feet is 81,683 million tons. The criticism of Prof. Hull's views is not convincing, inasmuch as M. Lozé, who does not appear to possess a practical knowledge of geology and mining, has not followed the recent investigations as to the limits at which mining may be carried on with profit. At the present time the greatest depth at which in Great Britain mining operations may be carried on has been reached at the Pendleton colliery, near Manchester, where the deepest workings are nearly 3500 feet below the surface. This enormous depth has, moreover, been exceeded in other countries, notably in the Lake Superior district, where a shaft of the Calumet and Hecla copper mine has now attained the record depth of 4900 feet, and in Belgium, where a colliery at Mons is 3937 feet deep. Depths such as these show that the limit of depth of 4000 feet assumed by Prof. Hull is well within the bounds of possibility. In view of the marvellous efficiency of modern winding-engines, no considerations of a mechanical nature need limit the prospective depth of shafts. By far the most important obstacle to very deep mining is the increase of temperature in proportion to the depth. Here, again, the author is apparently not familiar with recent observations. Since 1848 and 1854, the dates of observations cited by him, methods of determining earth temperatures have been greatly improved, and the results recently obtained at the Paruschowitz borehole in Silesia, put down by the Prussian Government to a depth of 6573 feet, show an increase of temperature of 1° F. for every 62·1 feet. This rate of increase would not present an insuperable obstacle to mining at a depth of 4000 feet.

The author gives in tabular form an estimate of the population, coal output, export and consumption for the years 1899 to 1950, by which date the 15,000 million tons assumed to be now remaining will be exhausted. The prosperity assured by the coal of the country to navigation, manufactures and commerce will then gradually disappear, and the historian of a powerful empire will conclude, the author prophesies, his account of a remarkable period by the words: *Finis Britanniae!* Happily, however, the array of statistics, the copious particulars of the coal-seams, and the faithfully translated estimates of eminent experts do not altogether justify the author's Cassandra-like attitude.

The work has been compiled with great care, and the author deserves high praise for the accuracy with which the names of English places and persons have been presented. On p. 564 there is a curious slip. Speaking of the introduction of railways in 1844, the author says: "Mine, aubergiste of the George, pleurait la fin des diligences." The archaic expression "Mine host" has proved too severe a test for the author's undoubtedly extensive knowledge of the English language.

BENNETT H. BROUGH.

OUR BOOK SHELF.

Ueber den Bau und die Entwicklung der Linse. By Dr. Carl Rabl. Pp. 324; plates 14. (Leipzig, 1900.)

IN the "Notes" column brief mention has recently been made of the concluding portion of Dr. Rabl's important investigations on the structure and development of the crystalline lens of the eye, which appeared in the *Zeitschrift für wiss. Zoologie*. The author has now reproduced the entire monograph as a separate work, with the original coloured plates; and since it is a most elaborate treatise on a very difficult subject, its appearance in this form should be welcomed by all students of this branch of anatomy.

There are, perhaps, few phenomena in the developmental history of animals more astounding to the ordinary mind than the fact that a structure seated so comparatively deep as is the crystalline lens of the human eye should arise from the outer, or epiblastic, layer of the embryo, and attain its permanent position, first by invagination, and then by separation from its parent layer. Nevertheless, it is a fact about which there can be no possibility of dispute; and the more superficial position occupied by the spherical lens of fishes serves, in a measure, to indicate the manner in which the conditions obtaining in the mammalian eye have been gradually evolved.

By means of the beautiful series of plates illustrating Dr. Rabl's work the student is enabled to comprehend at a glance, firstly, the mode of development of the lens respectively characteristic of fishes, amphibians, reptiles, birds and mammals; and, secondly, the different histological peculiarities presented by the lens itself in the same groups. Within the limits of a notice in this column, it is out of the question to discuss any details of the work before us; but it may be mentioned that in the concluding section the author enters into the abstruse speculation as to what may have been the degree of development of the eye in *Archaeopteryx* and other extinct animals, and also as to the gradations which may have formerly existed between the present differentiated types of lens-structure. Very interesting, too, are his observations with regard to the lens in the aborted eye of the mole. Here the rudimentary condition of the lens does not commence in the course of development, or in the fully adult animal; but it is distinctly ob-

servable in the earliest stages, when it is relatively smaller and contains fewer cells than in other mammals. Hence we have evidence of the extreme antiquity of the mole's adaptation to its present state of existence—evidence fully supported by palæontological facts.

The work may be characterised as a masterpiece of patient and careful investigation in an abstruse and difficult line of research.

R. L.

Building Construction for Beginners. By J. W. Riley. Pp. vi + 255. (London: Macmillan and Co., Ltd., 1899.)

THIS is an addition to the increasing number of works on Elementary Building Construction, which all have for their ultimate goal the preparation of students for the May examinations of the Department of Science and Art.

Commencing with the inevitable introductory remarks on drawing instruments and scales, the student is taken through all the various building trades, and at the end of each are added questions in the form of examination papers which should test the student's knowledge as he advances.

As the author observes, isometric projection is a very valuable means of showing the beginner exactly what is intended, as it gives in one view the plan, elevation and section of the object portrayed. We are glad to see that an extensive use is made of such a form of illustration.

We may also congratulate our author on abstaining from confusing his illustrations by figuring with too many dimensions. Some authors refer with pride to their use of such a system but as Mr. Riley observes, it is very confusing, and tends by its complication to hinder the very object for which it is introduced.

In a new edition several small slips can be attended to, such, for instance, as the wall-plate surroundings in Fig. 384. The brickwork in this case should be taken up to the underside of the tiles. The "summary" at the end of each trade is an excellent innovation, and the book can be confidently recommended as the best of its class.

Catalogue of the Fossil Bryozoa in the Department of Geology, British Museum (Natural History). The *Cretaceous Bryozoa*. Vol. i. By Dr. J. W. Gregory. Pp. xiv + 457, and plates. (London: Printed by the order of the Trustees, 1899.)

WE may congratulate Dr. J. W. Gregory in having completed this volume before he left this country to take up the geological professorship at Melbourne. The value of this, and similar works, is inestimable to palæontologists in all parts of the world. The book itself is naturally a list of hard names; but it is something nowadays to know which is the correct name to apply to any particular fossil, and Dr. Gregory gives as far as possible the synonymy, diagnosis, dimensions and geological distribution of each species. A number of woodcuts in the text and seventeen excellent plates illustrate a great many of the species. We should have been glad of a table of the Cretaceous strata, to inform or remind us of the approximate British equivalents of such divisions as Rhodanian, Campanian, Hauterivian, &c., and also to indicate the sense in which the terms Neocomian and Cenomanian are used.

The volume deals with the various families which are included under the sub-orders Tubulata, Cancellata and Dactylethrata. All these are ranged under the order Cyclostomata, the sub-class Gymnolamata, the class Ectoprocta and the group Bryozoa. It will be remembered that in the catalogue of recent marine forms in the British Museum, by Busk, that author employed the term Polyzoa instead of Bryozoa. The effort to secure a fixity in zoological nomenclature is one of the trials which beset the path of the worker. Dr. Gregory's carefully prepared catalogue will, we hope, have a permanent value in this respect.